CLAIMS

1. A method for repairing a damaged myocardium in a mammal, comprising:

a) providing a three-dimensional porous polysaccharide matrix;

b) introducing mammalian cells into said matrix;

c) growing said cells in said matrix *in vitro*, until a tissue-engineered biograft is formed, comprising a contracting tissue; and

d) transplanting the tissue-engineered biograft onto the myocardial tissue or myocardial scar tissue of said mammal, optionally previously removing scar or dead tissue from the site of implantation.

2. A method according to claim 1, wherein said polysaccharide matrix comprises an alginate polysaccharide.

3. A method according to claim 1 ~~or 2~~, wherein the polysaccharide matrix generates a scaffold.

4. A method according to claim 1, wherein the mammalian cells are selected from the group consisting of fetal cardiomyocytes, neonatal cardiomyocytes, adult cardiac cells, fibroblasts, smooth muscle cells, endothelial cells, skeletal myoblasts, mesenchymal stem cells and embryonic stem cells.

5. A method according to claim 4, wherein the fetal cardiomyocytes or neonatal cardiomyocytes are co-cultured with endothelial cells, cardiofibroblasts or smooth muscle cells.

6. A method according to claim 5, wherein said endothelial cells form capillary-like tubes within the scaffold.

7. A method according to claim 1, wherein said polysaccharide matrix further comprise controlled-release polymeric microspheres, said microspheres being able of releasing soluble factors in a controlled manner.

8. A method according to claim 7, wherein said soluble factors comprise growth factors, genes or DNA.

9. A method according to claim 1, wherein said myocardial damage is due to myocardial infarction.

10. A method according to claim 1, wherein said myocardial damage is due to a congenital heart defect.

11. Use of a porous polysaccharide matrix in the preparation of a three-dimensional tissue-engineered biograft for the transplantation of mammalian cells into the heart, for the repair of damaged myocardium.

12. Use according to claim 11, wherein said polysaccharide is an alginate polysaccharide.

13. Use according to claim 11, wherein said mammalian cells are selected from the group consisting of fetal cardiomyocytes, neonatal cardiomyocytes, adult cardiac cells, fibroblasts, smooth muscle cells, endothelial cells, skeletal myoblasts, mesenchymal stem cells and embryonic stem cells.

14. Use according to claim 11, wherein said myocardial damage is due to myocardial infarction.

15. Use according to claim 11, wherein said myocardial damage is due to a congenital heart defect.

16. A tissue-engineered cardiac biograft for transplantation into myocardial tissue or myocardial scar tissue, comprising a porous polysaccharide matrix containing mammalian cells, wherein said cells have been cultured in said matrix *in vitro*.

17. A tissue-engineered cardiac biograft according to claim 16, wherein said polysaccharide is an alginate.